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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,054	11/17/2003	Masanobu Ogino	245557US0S X	1158

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EXAMINER	
NGUYEN, THANH T	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/713,054	OGINO ET AL.	
	Examiner	Art Unit	
	Thanh T. Nguyen	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 6 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) *6-9, 14-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 10-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/17/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I, claims 1-5, 10-13 are drawn to a semiconductor substrate is acknowledged. The traversal is on the ground(s) that the subject matter of all claims 1-17 is sufficiently related that a thorough search for the subject matter of any one group of the claims would encompass a search for the subject matter of the remaining claims. This is not found persuasive because claims 6-9, 14-17 would require further search and for the reason of the last Office Action. The requirement is still deemed proper and is therefore made FINAL.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119 (a)-(d).

Information Disclosure Statement

The information disclosure statement filed on 11/7/03 has been considered.

Oath/Declaration

Oath/Declaration filed on 11/7/03 has been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Blanchard (U.S. Patent No. 2002/0125527).

Referring to figure 3, Blanchard a semiconductor substrate comprising:

a lightly doped substrate (25, n-type) that contains impurities at a low concentration (see figure 3, paragraph# 31);

a heavily doped diffusion layer (11, see paragraph# 31, figure 3) which is formed over a top of the lightly doped substrate (25) and is higher impurity concentration than the lightly doped substrate (see paragraph# 31); and

an epitaxial layer (12) which formed over a top of the heavily doped diffusion layer and contains impurities at a lower concentration than the heavily doped diffusion layer (see figure 3, paragraph# 31).

Claims 10, 11, 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Adamic Jr. (U.S. Patent No. 6,124,179).

Referring to figures 2a-2d, Adamic Jr., teaches a semiconductor substrate comprising:

a heavily doped diffusion layer (N+)which is formed over a top of a lightly doped substrate and is higher in impurity concentration than the lightly doped substrate, the lightly doped substrate being removed at a final stage of a process; and

an epitaxial layer (N-) which is formed over a top of the heavily doped diffusion layer (N+) and contains impurities at a lower concentration than the heavily doped diffusion layer, wherein an impurity diffusion layer for forming a semiconductor device is formed the epitaxial layer (see figure 2a-2d, col. 8, lines 1-10, col. 11, line 33-40).

regarding to claim 11, wherein a resistance of the epitaxial layer 10Ωcm or less (see col. 8, lines 7-10) .

Regarding to claims 13, the lightly doped substrate and the heavily doped diffusions layer (N+) are of a first conductivity type, and the epitaxial layer is of a second conductivity type (232)

With regard to claim 10, 13, the term "the lightly doped substrate being removed at a final stage of a process" is method recitations in a device claimed, and they are non-limiting, because only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made

> to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-5, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blanchard (U.S. Patent No. 2002/0125527) as applied to claim 1 above, or Adamic Jr. (U.S. Patent No. 6,124,179) as applied to claims 10-11, 13 above in view of the admitted Prior Art of the Present Invention, pages 1-4.

Blanchard teaches a semiconductor substrate having a lightly doped, heavily doped and an epitaxialy layer, wherein the heavily doped diffusion layer and the epitaxial layer are of the same conductivity type (see figure 3, wherein both heavily doped and epitaxial layer are n-type). However, the reference does not teach the light doped substrate contains phosphorus or boron, the resistance of the epitaxial layer is 10Ωcm or less, and the lightly doped substrate and the heavily doped diffusion layer are of a first conductivity type, and the epitaxial layer is of a second conductivity type.

The Admitted prior art teaches the lightly doped substrate contains phosphorus or boron (see page 1, lines 20-25, meeting claim 2), the resistance of the epitaxial layer is 10Ωcm or less (see page 4, lines 12-13, meeting claim 3).

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would form a device having the light doped substrate contains phosphorus or boron, the resistance of the epitaxial layer is 10Ωcm or less in process of Blanchard or Adamic, Jr. as taught by the Admitted Prior because doping the material into the layer to improve the conductivity of the device

It is known in the art to have the lightly doped substrate and the heavily doped diffusion layer are of a first conductivity type, and the epitaxial layer is of a second conductivity type.

Therefore, it would have been obvious to a person of ordinary skill in the requisite art at the time of the invention was made would form the lightly doped substrate and the heavily doped diffusion layer are of a first conductivity type, and the epitaxial layer is of a second conductivity type in process of Blanchard because changing the conductivity type would provide a desire device.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (571) 272-1695, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached on (571) 272-1702. The fax phone number for this Group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (**See MPEP 203.08**).

Thanh Nguyen
Patent Examiner
Patent Examining Group 2800

TTN